SEQUENCE LISTING

- <110> Duvick, Jonathan P. Gilliam, Jacob T. Maddox, Joyce R. Rao, Aragula Gururaj Crasta, Oswald R. Folkerts, Otto
- <120> Amino Polyol Amine Oxidase Polynucleotides and Related Polypeptides and Methods of Use
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- <150> US 60.135,391
- <151> 1999-05-21
- <150> US 09/352,159
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tgg Trp 305) Ası	c aaq o Ly:	g ccq s Pro	g tgg o Trp	g tgg Trp 310) Ar	g gaa	a caa ı Glr	a ggo n Gly	tto Phe	s Se	g ggo r Gly	gto Val	c cto l Le	c caa u Gln 320	960)

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tcg Ser	gcg Ala	ctc Leu	aga Arg 420	acg Thr	ccg Pro	ttc Phe	aag Lys	agt Ser 425	gtt Val	cat His	ttc Phe	gtt Val	gga Gly 430	acg Thr	gag Glu	1296
acg Thr	tct Ser	tta Leu 435	gtt Val	tgg Trp	aaa Lys	ggg Gly	tat Tyr 440	atg Met	gaa Glu	ggg	gcc Ala	ata Ile 445	cga Arg	tcg Ser	ggt Gly	1344
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Lys Ser Ala Thr Gly Leu Ser Asn Ile Phe Ser Asp Lys Lys Asp Gly
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Gly Gln Tyr Met Arg Cys Lys Thr Gly Met Gln Ser Ile Cys His Ala
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Pro Ala Asn Val Leu Glu Ile Glu Trp Ser Lys Gln Gln Tyr Phe Gln
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expression vectors, N23256

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ttt Phe -25	ata Ile	aat Asn	act Thr	act Thr	att Ile -20	gcc Ala	agc Ser	att Ile	gct Ala	gct Ala -15	aaa Lys	gaa Glu	gaa Glu	ggg Gly	gta Val -10	240
tct Ser	ctc Leu	gag Glu	aaa Lys	aga Arg -5	gag Glu	gct Ala	gaa Glu	gct Ala	gaa Glu 1	ttc Phe	aaa Lys	gac Asp	aac Asn 5	gtt Val	gcg Ala	288
gac Asp	gtg Val	gta Val 10	gtg Val	gtg Val	ggc Gly	gct Ala	ggc Gly 15	ttg Leu	agc Ser	ggt Gly	ttg Leu	gag Glu 20	acg Thr	gca Ala	cgc Arg	336
aaa Lys	gtc Val 25	cag Gln	gcc Ala	gcc Ala	ggt Gly	ctg Leu 30	tcc Ser	tgc Cys	ctc Leu	gtt Val	ctt Leu 35	gag Glu	gcg Ala	atg Met	gat Asp	384
cgt Arg 40	gta Val	ggg Gly	gga Gly	aag Lys	act Thr 45	ctg Leu	agc Ser	gta Val	caa Gln	tcg Ser 50	ggt Gly	ccc Pro	ggc Gly	agg Arg	acg Thr 55	432
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ctt Leu 120	gcg Ala	gaa Glu	ctc Leu	ctc Leu	ccc Pro 125	gta Val	tgg Trp	tct Ser	cag Gln	ctg Leu 130	atc Ile	gaa Glu	gag Glu	cat His	agc Ser 135	672
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ggc	gta	gca	aac	cag	atc	aca	cgc	gct	ctg	ctc	ggt	gtg	gaa	gcc	cac	816

Gly	Val	Ala 170	Asn	Gln	Ile	Thr	Arg 175	Ala	Leu	Leu	Gly	Val 180	Glu	Ala	His	
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												cag Gln				913
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		_	_				_		_			tcg Ser				1248
				-	_	_						gat Asp 340				1296
												aag Lys				1344
												caa Gln				1392
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gtc Val	tat Tyr	ggg Gly 410	ctg Leu	aac Asn	gat Asp	ctc Leu	atc Ile 415	aca Thr	ctg Leu	ggt Gly	tcg Ser	gcg Ala 420	ctc Leu	aga Arg	acg Thr	1536
ccg Pro	ttc Phe 425	aag Lys	agt Ser	gtt Val	cat His	ttc Phe 430	gtt Val	gga Gly	acg Thr	gag Glu	acg Thr 435	tct Ser	tta Leu	gtt Val	tgg Trp	1584
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Thr	Ile	Asn	Asp	Leu 60	Gly	Ala	Ala	Trp	Ile 65	Asn	Asp	Ser	Asn	Gln 70	Ser	
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Leu Ser Asn Ile Phe Ser Asp Lys Lys Asp Gly Gln Tyr Met Arg
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Cys Lys Thr Gly Met Gln Ser Ile Cys His Ala Met Ser Lys Glu Leu
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Val Pro Gly Ser Val His Leu Asn Thr Pro Val Ala Glu Ile Glu Gln
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Trp Trp Arg Glu Gln Gly Phe Ser Gly Val Leu Gln Ser Ser Cys Asp
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Ser Ile Thr Cys Phe Met Val Gly Asp Pro Gly Arg Lys Trp Ser Gln
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Gln Ser Lys Gln Val Arg Gln Lys Ser Val Trp Asp Gln Leu Arg Ala
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≺.	2>	(688	3)	ature (690 ysine))									
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				gcc Ala 70									240	
				cca Pro									288	
				att Ile									336	
				ctc Leu									384	
				gaa Glu									432	
				cat His 150									480	
				gac Asp									528	
				cgt Arg									576	

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_					_					-	_	ctg Leu	_	_		67:
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												cag Gln				763
~		~		_				_	-	-	-	Gly ggg		-		816
												aac Asn 285				864
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												act Thr				960
												cct Pro				1008
												gaa Glu				1056
-	-											gac Asp 365			_	1104
												gcg Ala				1152
												gca Ala				1200
												agc Ser				1248
ctc	acc	gac	tac	atc	aag	agt	gcc	acc	ggt	ctc	agt	aat	att	ttc	tcg	1296

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			aag Lys													1584
			gtc Val													1633
	_	~ ~	gtc Val			_	_	-	_							1680
			atc Ile													1728
			ccg Pro 580													1776
			gtc Val													182-
			cca Pro													187.
			ttc Phe													1920
			ctg Leu													1968

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			Tyr	165					170					175			
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225			Glu		230					235					240		
			Ser	245					250					255			
			Leu 260					265					270				
		275	Gln				280					285			_		
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Pro Ala Glu Lys Gln Ala Leu Ala Glu Asn Ser Ile Leu Gly Tyr Tyr
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Phe Ser Gly Val Leu Gln Ser Ser Cys Asp Pro Ile Ser Phe Ala Arg
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Asp Thr Ser Ile Asp Val Asp Arg Gln Trp Ser Ile Thr Cys Phe Met
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Val Gly Asp Pro Gly Arg Lys Trp Ser Gln Gln Ser Lys Gln Val Arg
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Gln Lys Ser Val Trp Asp Gln Leu Arg Ala Ala Tyr Glu Asn Ala Gly
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Leu Ile Thr Leu Gly Ser Ala Leu Arg Thr Pro Phe Lys Ser Val His
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Phe Val Gly Thr Glu Thr Ser Leu Val Trp Lys Gly Tyr Met Glu Gly
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<223> Nucleotide sequence of K:trAPAO translational

fusion with barley alpha amylase signal sequence, for expression and secretion of the mature trAPAO in maize. Nucleotides 1-72, barley alpha amylase signal sequence, nucleotides 73-75, added lysine residue; nucleotides 76-1464, trAPAO cDNA.

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                                    -15
                -20
                                                                       96
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Leu Ser Ala Ser Leu Ala Ser Gly Lys Asp Asn Val Ala Asp Val Val
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gtg gtg ggc gct ggc ttg agc ggt ttg gag acg gca cgc aaa gtc cag
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Val Val Gly Ala Gly Leu Ser Gly Leu Glu Thr Ala Arg Lys Val Gln
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                         15
gcc gcc ggt ctg tcc tgc ctc gtt ctt gag gcg atg gat cgt gta ggg
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Ala Ala Gly Leu Ser Cys Leu Val Leu Glu Ala Met Asp Arg Val Gly
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gga aag act ctg agc gta caa tcg ggt ccc ggc agg acg act atc aac
                                                                      240
Gly Lys Thr Leu Ser Val Gln Ser Gly Pro Gly Arg Thr Thr Ile Asn
qac etc qqc qet qeq tqq atc aat gac agc aac caa agc gaa gta tec
                                                                      288
Asp Leu Gly Ala Ala Trp Ile Asn Asp Ser Asn Gln Ser Glu Val Ser
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             60
aga ttg ttt gaa aga ttt cat ttg gag ggc gag ctc cag agg acg act
                                                                      336
Arg Leu Phe Glu Arg Phe His Leu Glu Gly Glu Leu Gln Arg Thr Thr
                             80
         75
gga aat tca atc cat caa gca caa gac ggt aca acc act aca gct cct
                                                                      384
Gly Asn Ser Ile His Gln Ala Gln Asp Gly Thr Thr Thr Ala Pro
     90
                                            100
                         95
tat ggt gac tcc ttg ctg agc gag gat gca agt gca ctt gcg gaa
                                                                      432
Tyr Gly Asp Ser Leu Leu Ser Glu Glu Val Ala Ser Ala Leu Ala Glu
105
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ggc	tca	gtg	cac	ctc	aac	acc	CCC	gtc	gct	gaa	att	gag	cag	tcg	gca	2352

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	gtg Val															2448
	cca Pro															2496
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	gaa Glu															2592
	ttt Phe															2640
	tgt Cys															2688
	cag Gln															2736
	aac Asn 890													_	_	2784
~ ~	tgg Trp	_	-	_	_					_						2832
	ctg Leu															2880
	agt Ser															2928
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Gly 345	Ala	Tyr	r Pro	Il∈	Gly 350	/ Ser		Gly	/ Ile	e Gly 355	Ser		Gln	Asp	Gln 360
Il∈	e Ala	Ala	a Ile	e Glu 365	Thr	Glu	ı Val	. Arg	Phe	Gln		Pro	Ser	Ala 375	Ile
Val	Ala	Glr	Asp 380		Arg	Asn	a Arg	r Gly 385	rIle		Ser	Trp	Arg 390	Tyr	Tyr
Tyr	Asn	Ala 395		Phe	e Glu	Asn	Leu 400		Leu	Phe	Pro	Gly 405	Ser		Val
Tyr	His 410	Ser	Ser	Glu	Val	Gly 415		Val	Phe	Gly	Thr 420		Pro	Val	Ala
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745			His		750					755					760
			Thr	765					770					775	
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ctc Leu	tcc Ser	gcc Ala	tcc Ser -5	Leu	gcc Ala	agc Ser	ggc Gly	acg Thr 1	gat Asp	ttt Phe	ccg Pro	gtc Val 5	cgc Arg	agg Arg	acc Thr	96
gat Asp	ctg Leu 10	ggc Gly	cag Gln	gtt Val	cag Gln	gga Gly 15	ctg Leu	gcc Ala	ggg ggg	gac Asp	gtg Val 20	Met	agc Ser	ttt Phe	cgc Arg	144
gga Gly 25	ata Ile	ccc Pro	tat Tyr	gca Ala	gcg Ala 30	ccg Pro	ccg Pro	gtg Val	ggc Gly	ggg Gly 35	ctg Leu	cgt Arg	tgg Trp	aag Lys	ccg Pro 40	192
ccc Pro	caa Gln	cac His	gcc Ala	cgg Arg 45	ccc Pro	tgg Trp	gcg Ala	ggc	gtt Val 50	cgc Arg	ccc Pro	gcc Ala	acc Thr	caa Gln 55	ttt Phe	240
ggc Gly	tcc Ser	gac Asp	tgc Cys 60	ttc Phe	ggc Gly	gcg Ala	gcc Ala	tat Tyr 65	ctt Leu	cgc Arg	aaa Lys	ggc Gly	agc Ser 70	ctc Leu	gcc Ala	288
ccc Pro	ggc Gly	gtg Val 75	agc Ser	gag Glu	gac Asp	tgt Cys	ctt Leu 80	tac Tyr	ctc Leu	aac Asn	gta Val	tgg Trp 85	gcg Ala	ccg Pro	tca Ser	336
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Gly	Ala 90	Lys	Pro	Gly	Gln	Tyr 95	Pro	Val	Met	Val	Trp 100	Val	Tyr	Gly	Gly	304
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					ccg Pro											768
					gcc Ala											816
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	_		_	_	ccg Pro 270			_		_	-					912
					gcg Ala											960
-					acc Thr											1008
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					cgt Arg											1248
					cac His											1296
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gcc tat Ala Tyr	-		-	_							-	1488
gcg gcg Ala Ala		~	Gly P					_		_		1536
gcc aag Ala Lys 490					-		-	-	-		·=	1584
aaa gac Lys Asp 505												1632
ttg gag Leu Glu												1680
ctt gag Leu Glu												1728
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gac agc Asp Ser 570		• •	•	_	_		-	_			_	1824
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gac ggt Asp Gly												1920
gag gtt Glu Val		-					-			_	_	1968
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				gtt Val							2304
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acg Thr	tct Ser	tta Leu	gtt Val 940	Trp	aaa Lys	ggg	tat Tyr	atg Met 945	gaa Glu	gly	gcc Ala	ata Ile	cga Arg 950	tcg Ser	ggt Gly	2928
caa Gln	cga Arg	ggt Gly 955	gct Ala	gca Ala	. gaa . Glu	gtt Val	gtg Val 960	Ala	agc Ser	ctg Leu	gtg Val	cca Pro 965	gca Ala	gca Ala		2973
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Asp	Leu	Gly	-5 Gln	Val	Gln	Gly	Leu	1 Ala	Gly	Asp	Val	5 Met	Ser	Phe	Arg	
Gly	10 Ile	Pro	Tyr	Ala	Ala	15 Pro	Pro	Val	Gly	Gly	20 Leu	Ara	Trp	Lvs	Pro	
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				45					50					55		
		Asp	60					65					70			
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Gly							80					85				
	Ala 90	Lys	Pro	Gly	Gln	Tyr 95		Val	Met	Val	Trp 100		Tyr	Gly	Gly	
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                                        355
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                                    370
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                                385
Arg Ala Pro Ala Thr His Gly Ala Glu Ile Pro Tyr Val Phe Gly Val
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                                                405
Phe Lys Leu Asp Glu Leu Gly Leu Phe Asp Trp Pro Pro Glu Gly Pro
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Thr Pro Ala Asp Arg Ala Leu Gly Gln Leu Met Ser Ser Ala Trp Val
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Arg Phe Ala Lys Asn Gly Asp Pro Ala Gly Asp Ala Leu Thr Trp Pro
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Ala Tyr Ser Thr Gly Lys Ser Thr Met Thr Phe Gly Pro Glu Gly Arg
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Ala Lys Ala Gly Gly Gly Gly Ser Gly Gly Ser Gly Gly Ser
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gga gc															3	36
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					tat Tyr											624
					gac Asp											672
					gct Ala 230											720
					act Thr											768
					ttt Phe											816
					tgg Trp											864
					caa Gln											912
					aat Asn 310											960
					aac Asn											1008
					tgg Trp											1056
					tac Tyr											1104
					atc Ile											1152
					cca Pro 390											1200

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ggt Gly	gat Asp	cct Pro	cga Arg 420	Lys	gtc Val	aca Thr	ata Ile	ttt Phe 425	gly	cag Gln	agt Ser	gcg Ala	ggg Gly 430	ggc	aga Arg	1296
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Thr 625	Phe	Glu	Asn	Leu	Glu 630	Leu	Phe	Pro	Gly	Ser 635	Glu	Val	Tyr	His	Ser 640	
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				_	caa Gln 710											2160
					gcg Ala											3208
					agc Ser											2256
	_	-	_	_	ggt Gly	•		_	-	-		_	-			2304
	_		_		gtt Val				-	_	_	-				2352
act Thr 785	ctg Leu	agc Ser	gta Val	caa Gln	tcg Ser 790	ggt Gly	ccc Pro	ggc Gly	agg Arg	acg Thr 795	act Thr	atc Ile	aac Asn	gac Asp	ctc Leu 800	2400
-	_				aat Asn	•	_			_	_	-		_	_	2448
					ttg Leu											2496
					caa Gln											2544
					gag Glu											2592

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						cgg Arg										2688
tgt Cys	gag Glu	aag Lys	gaa Glu 900	cta Leu	aac Asn	ttg Leu	cct Pro	gct Ala 905	gtt Val	ctc Leu	ggc Gly	gta Val	gca Ala 910	aac Asn	cag Gln	.:736
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						aag Lys 935										2832
tcg Ser 945	gac Asp	aag Lys	aaa Lys	gac Asp	ggc Gly 950	ggg Gly	cag Gln	tat Tyr	atg Met	cga Arg 955	tgc Cys	aaa Lys	aca Thr	ggt Gly	atg Met 960	2880
						atg Met										2928
						gct Ala										2976
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		Leu				ttg Leu 1015	Tyr					Phe				3072
ctt Leu 1025	Pro	gcc Ala	gag Glu	aag Lys	caa Gln 1030	gca Ala)	ttg Leu	gcg Ala	gaa Glu	aat Asn 1035	Ser	atc Ile	ctg Leu	ggc Gly	tac Tyr 1040	3120
					Phe	gta Val				Pro					Gln	3168
		Ser		Val		caa Gln			Cys					Phe		3216
	Asp		Ser			gtc Val		Arg					Thr			3264
atg	gtc	gga	gac	ccg	gga	cgg	aag	tgg	tcc 51	caa	cag	tcc	aag	cag	gta	3312

Ме	t Val 109		Asp	Pro	Gly	Arg 109		Trp	Ser	Gln	Gln 110		Lys	Gln	Val	
cg Ar 11	a caa g Gln 05	aag Lys	tct Ser	gtc Val	tgg Trp 111	Asp	caa Gln	ctc Leu	cgc Arg	gca Ala 111	Ala	tac Tyr	gag Glu	aac Asn	gcc Ala 1120	3360
gg Gl	g gcc y Ala	caa Gln	gtc Val	cca Pro 112	Glu	ccg Pro	gcc Ala	aac Asn	gtg Val 1130	Leu	gaa Glu	atc Ile	gag Glu	tgg Trp 113	Ser	3408
aa Ly	g cag s Gln	cag Gln	tat Tyr 114	Phe	caa Gln	gga Gly	gct Ala	ccg Pro 1145	Ser	gcc Ala	gtc Val	tat Tyr	ggg Gly 115	Leu	aac Asn	3456
ga Asj	t ctc o Leu	atc Ile 115	Thr	ctg Leu	ggt Gly	tcg Ser	gcg Ala 1160	Leu	aga Arg	acg Thr	ccg Pro	ttc Phe 116	Lys	agt Ser	gtt Val	3504
ca Hi:	t ttc s Phe 117	Val	gga Gly	acg Thr	gag Glu	acg Thr 1175	Ser	tta Leu	gtt Val	tgg Trp	aaa Lys 118	Gly	tat Tyr	atg Met	gaa Glu	3552
ggg Gl <u>y</u> 118	g gcc y Ala 35	ata Ile	cga Arg	tcg Ser	ggt Gly 1190	Gln	cga Arg	ggt Gly	gct Ala	gca Ala 1195	Glu	gtt Val	gtg Val	gct Ala	agc Ser 1200	3600
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					att Ile											336
	_		_		ctc Leu		-	-			-	_			_	384
_	_				gaa Glu											432
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					tat Tyr											624
_					gac Asp					-	-	_	_	_	_	672
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											ctc Leu 300					912
											ccg Pro					960
											ggc Gly		-		-	1008
											gag Glu					1056
			-			-					acg Thr			_		1104
		_					_	_		-	ccc Pro 380				_	1152
											ctt Leu				_	1200
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											ctg Leu					1296
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						tac Tyr										1680
						gcg Ala		_				_			-	1728
						gcg Ala										1776
						tcg Ser										1824
						aac Asn 615										1872
						att Ile										1920
						gat Asp										1968
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		gac Asp														0256
		aaa Lys 755														2304
		cgt Arg														2352
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		aca Thr 835														2544
		ctt Leu														2592
		ctt Leu														2640
		agc Ser														2688
		ggc Gly														2736
		gag Glu 915														2784
		ctc Leu														2832

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		gtt Val														2928
		tcg Ser														2976
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		tgg Trp			Glu					Gly					Ser	3168
		ccc Pro		Ser					Thr					Asp		3216
		tcc Ser 1075	Ile					Val					Arg			3264
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	Ala	gcc Ala				Ala					Pro					3360
		gaa Glu			Trp					Tyr					Pro	3408
		gtc Val		Gly					Ile					Ala		3456
		ccg Pro 1155	Phe					Phe					Thr			3504
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Val Val Leu Tyr Met Asp Pro Met Cys Leu Asp Ala Phe Pro Lys Leu
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Val Cys Phe Lys Lys Arg Ile Glu Ala Ile Pro Gln Ile Asp Lys Tyr
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Gly Ser Val His Leu Asn Thr Pro Val Ala Gly Ile Glu Gln Ser Ala
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Gly Leu Asn Asp Leu Ile Thr Leu Gly Ser Ala Leu Arg Thr Pro Phe
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780 840

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			260					265				Ser	270		
		275					280					Val 285			
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Phe Met Val Gly Asp Pro Gly Arg Lys Trp Ser Gln Gln Ser Lys Gln
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<212> PRT

<213> Rhinocladiella atrovirens

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Ala	Tyr 50	Glu	Lys	Gln	Val	Ala 55	Gln	Ala	Phe	Ala	Asn 60	Leu	Arg	Ala	Cys
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			100					Arg 105					110		
		115					120	Glu				125		_	
	130					135		Thr		_	140			_	
Val 145	Val	Val	Gly	Ala	Gly 150	Leu	Ser	Gly	Leu	Glu 155	Thr	Ala	Arg	Lys	Val 160
				165				Val	170					175	
Gly	Gly	Lys	Thr 180	Leu	Ser	Val	Gln	Ser 185	Gly	Gly	Arg	Thr	Thr 190	Ile	Asn
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225					230			Gly		235					240
Gly	Ser	Leu	Leu	Ser 245	Glu	Glu	Val	Ala	Ser 250	Ala	Leu	Ala	Glu	Leu 255	Leu
Pro	Ala	Ser	Gln 260	Leu	Ile	Glu	Glu	His 265	Ser	Leu	Glu	Asp	Pro 270	Lys	Ala
Ser	Pro	Gln 275	Ala	Lys	Gln	Leu	Asp 280	Ser	Val	Ser	Phe	Ala 285	His	Tyr	Cys
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Thr Pro Val Ala Glu Ile Glu Gln Ser Ala Ser Gly Cys Thr Val Arg
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gageceteaa gegaageage tegacagtgt gagettegea cactactgtg agaaggatet
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cagcatag
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Lys Leu Phe Glu Arg Phe His Leu Glu Gly Glu Leu Gln Arg Thr Thr
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Gly Asn Ser Ile His Gln Ala Gln Asp Gly Thr Thr Thr Thr Ala Pro
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Tyr Gly Asp Ser Leu Leu Ser Glu Glu Val Ala Ser Ala Leu Ala Glu
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Leu Leu Pro Ala Trp Ser Gln Leu Ile Glu Glu His Ser Leu Glu Asp
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Pro Lys Ala Ser Pro Gln Ala Lys Gln Leu Asp Ser Val Ser Phe Ala
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His Tyr Cys Glu Lys Asp Leu Asn Leu Pro Ala Val Leu Gly Val Ala
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                                           300
Asn Gln Ile Thr Arg Ala Leu Leu Gly Val Glu Ala His Glu Ile Ser
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Met Leu Phe Leu Thr Asp Tyr Ile Lys Ser Ala Thr Gly Leu Ser Asn
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                                    330
Ile Val Ser Asp Lys Lys Asp Gly Gly Gln Tyr Met Arg Cys Lys Thr
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            340
                                                    350
Gly Met Gln Ser Leu Cys His Ala Met Ser Lys Glu Leu Val Pro Gly
                           360
Ser Val His Leu Asn Thr Pro Val Ala Glu Ile Glu Gln Ser Ala Ser
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Gly Cys Thr Val Arg Ser Ala Ser Gly Gly Val Phe Arg Ser Lys Lys
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Val Ser Leu Pro Thr Thr Leu Tyr Pro Thr Leu Ile Phe Ser Pro Leu
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Pro Ala Glu Lys Gln Ala Leu Ala Glu Lys Ser Ile Gly Tyr Tyr Ser
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Lys Ile Val Phe Val Asp Lys Leu Trp Trp Arg Glu Gln Gly Phe Ser
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Pro Arg Lys Trp Ser Gln Gln Ser Lys Gln Val Arg Gln Lys Ser Val
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Glu Pro Ala Asn Val Leu Glu Ile Glu Trp Ser Lys Gln Gln Tyr Phe
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Gln Ala Pro Ser Ala Val Tyr Gly Leu Asn Cys Leu Asn Thr Leu Gly
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Leu Ala Ala Val Gly Ala Thr Ser Asn Asp Val Thr Lys Leu Asn Tyr
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Tyr Ile Val Asp Tyr Ala Pro Ser Lys Leu Thr Ala Ile Gly Asp Gly
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Leu Lys Ala Thr Phe Ala Leu Asp Arg Leu Pro Pro Cys Thr Leu Val
            100
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Pro Val Ser Ala Leu Ser Ser Pro Glu Tyr Leu Phe Glu Val Asp Ala
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Thr Ala Leu Val Pro Gly His Thr Thr Pro Asp Asn Val Ala Asp Val
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Val Val Gly Ala Gly Leu Ser Gly Leu Glu Thr Ala Arg Lys Val
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Gln Ala Ala Gly Leu Ser Cys Leu Val Leu Glu Ala Met Asp Arg Val
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Gly Gly Lys Thr Leu Ser Val Gln Ser Gly Pro Gly Arg Thr Thr Ile
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Asn Asp Leu Gly Ala Ala Trp Ile Asn Asp Ser Asn Gln Ser Glu Val
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Ser Arg Leu Phe Glu Arg Phe His Leu Glu Gly Glu Leu Gln Arg Thr
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                                            220
Thr Gly Asn Ser Ile His Gln Ala Gln Asp Gly Thr Thr Thr Ala
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Pro Tyr Gly Asp Ser Leu Leu Ser Glu Glu Val Ala Ser Ala Leu Ala
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                                   250
Glu Leu Leu Pro Val Trp Ser Gln Leu Ile Glu Glu His Ser Leu Gln
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Asp Leu Lys Ala Ser Pro Gln Ala Lys Arg Leu Asp Ser Val Ser Phe
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                           280
                                                285
Ala His Tyr Cys Glu Lys Glu Leu Asn Leu Pro Ala Val Leu Gly Val
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                                            300
Ala Asn Gln Ile Thr Arg Ala Leu Leu Gly Val Glu Ala His Glu Ile
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                                       315
Ser Met Leu Phe Leu Thr Asp Tyr Ile Lys Ser Ala Thr Gly Leu Ser
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Asn Ile Phe Ser Asp Lys Lys Asp Gly Gly Gln Tyr Met Arg Cys Lys
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                               345
Thr Gly Met Gln Ser Ile Cys His Ala Met Ser Lys Glu Leu Val Pro
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Gly Ser Val His Leu Asn Thr Pro Val Ala Glu Ile Glu Gln Ser Ala
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Lys Val Val Ser Leu Pro Thr Thr Leu Tyr Pro Thr Leu Thr Phe
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Ser Pro Pro Leu Pro Ala Glu Lys Gln Ala Leu Ala Glu Asn Ser Ile
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Glu	Asn	Ala 515	Glγ	Ala	Gln	Val	Pro 520	Glu	Pro	Ala	Asn	Val 525	Leu	Glu	Ile	
Glu	Trp 530		Lys	Gln	Gln	Tyr 535		Gln	Gly	Ala	Pro 540		Ala	Val	Tyr	
Gly 545	Leu	Asn	Asp	Leu	Ile 550	Thr	Leu	Gly	Ser	Ala 555	Leu	Arg	Thr	Pro	Phe 560	
	Ser	Val	His	Phe 565		Gly	Thr	Glu	Thr 570		Leu	Val	Trp	Lys 575		
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				cgc Arg												96
				gat Asp												144
				acg Thr								_		_		192
gac Asp 65	agc Ser	aac Asn	caa Gln	agc Ser	gaa Glu 70	gta Val	tcc Ser	aga Arg	ttg Leu	ttt Phe 75	gaa Glu	aga Arg	ttt Phe	cat His	ttg Leu 80	240
				cag Gln 85												288
				act Thr												336
gag	gtt	gca	agt	gca	ctt	gcg	gaa	ctc	ctc 83	ccc	gta	tgg	tct	cag	ctg	384

Glu	Val	Ala 115	Ser	Ala	Leu	Ala	Glu 120	Leu	Leu	Pro	Val	Trp 125	Ser	Gln	Leu	
	-			-			-		_	-	agc Ser 140					432
											gag Glu					480
											aca Thr					528
	-										ctc Leu					576
											gac Asp					624
	_		-	_	-				_	_	tcg Ser 220					672
_		_	-		_						ctc Leu					720
_	-			-	_	-			-		gta Val	-				768
											tcg Ser					816
											ccc Pro					864
											agc Ser 300					912
											ttc Phe					960
											gat Asp					1008
											gtc Val					1056

	aag Lys															1104
_	caa Gln 370															1152
_	gcc Ala				-				-	_	_	_				1200
	gct Ala		_													1248
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	tct Ser															1344
	cga Arg 450														tag *	1392
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l Leu Gly Asp 65 Glu Asp	Asp Glu Glu Pro 50 Ser Gly Gly	211> 212> 213> 220> 223> 400> Asn Thr Ala 35 Gly Asn Glu Thr Ala 115	A63 PRT Unkr Cys 49 Val Ala 20 Met Arg Gln Leu Thr 100 Ser	(-) Ala 5 Arg Asp Thr Ser Gln 85 Thr Ala	Asp Lys Arg Thr Glu 70 Arg Thr Leu	Val Val Ile 55 Val Thr Ala Ala	Val Gln Gly 40 Asn Ser Thr Pro Glu 120	Val Ala 25 Gly Asp Arg Gly Tyr 105 Leu	Val 10 Ala Lys Leu Leu Asn 90 Gly Leu	Gly Gly Thr Gly Phe 75 Ser Asp	Ala Leu Leu Ala 60 Glu Ile Ser Val	Gly Ser Ser 45 Ala Arg His Leu Trp 125	Cys 30 Val Trp Phe Gln Leu 110 Ser	15 Leu Gln Ile His Ala 95 Ser Gln	Val Ser Asn Leu 80 Gln Glu Leu	

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Gly Val Glu Ala His Glu Ile Ser Met Leu Phe Leu Thr Asp Tyr Ile
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Lys Ser Ala Thr Gly Leu Ser Asn Ile Phe Ser Asp Lys Lys Asp Gly
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Gly Gln Tyr Met Arg Cys Lys Thr Gly Met Gln Ser Ile Cys His Ala
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                                           220
Met Ser Lys Glu Leu Val Pro Gly Ser Val His Leu Asn Thr Pro Val
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                                       235
Ala Glu Ile Glu Gln Ser Ala Ser Gly Cys Thr Val Arg Ser Ala Ser
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Gly Ala Val Phe Arg Ser Lys Lys Val Val Val Ser Leu Pro Thr Thr
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Leu Tyr Pro Thr Leu Thr Phe Ser Pro Pro Leu Pro Ala Glu Lys Gln
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Ala Leu Ala Glu Asn Ser Ile Leu Gly Tyr Tyr Ser Lys Ile Val Phe
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Gln Ser Ser Ser Asp Pro Ile Ser Phe Ala Arg Asp Thr Ser Ile Asp
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Arg Lys Trp Ser Gln Gln Ser Lys Gln Val Arg Gln Lys Ser Val Trp
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Pro Ala Asn Val Leu Glu Ile Glu Trp Ser Lys Gln Gln Tyr Phe Gln
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Gly Ala Pro Ser Ala Val Tyr Gly Leu Asn Asp Leu Ile Thr Leu Gly
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                                   410
Ser Ala Leu Arg Thr Pro Phe Lys Ser Val His Phe Val Gly Thr Glu
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Leu Glu Thr Ala Arg Lys Val Gln Ala Ala Gly Leu Ser Cys Leu Val
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		=		cc ttg ctg agc er Leu Leu Ser 110	
				ta tgg tct cag al Trp Ser Gln 125	
	_	_		ge eet eag geg er Pro Gln Ala 10	
				ag aag gaa cta lu Lys Glu Leu	
				ca cgc gct ctg nr Arg Ala Leu 175	
				cc acc gac tac eu Thr Asp Tyr 190	_
				ac aag aaa gac sp Lys Lys Asp 205	
				eg att teg eat er Ile Ser His 20	
				ce aac acc ccc eu Asn Thr Pro	
				ta cga tcg gcc al Arg Ser Ala 255	

	-	agc aaa aag Ser Lys Lys			_		816
Leu Tyr Pi	_	aca ttt tca Thr Phe Ser 280		_			864
		tct atc ctg Ser Ile Leu 295			_		912
		tgg tgg cgc Trp Trp Arg 310	Glu Gln (960
-		ccc atc tca Pro Ile Ser	-		-	9	1008
		tcc att acc Ser Ile Thr	_			33	L056
Arg Lys Ti		cag tcc aag Gln Ser Lys 360		-	_	- 3 3	L104
		gcc tac gag Ala Tyr Glu 375				3.3	L152
		gaa atc gag Glu Ile Glu 390	Trp Ser 1				L200
		gtc tat ggg Val Tyr Gly		_	_	55-	L248
	-	ccg ttc aag Pro Phe Lys		_		5 5	L296
Thr Ser Le		aaa ggg tat Lys Gly Tyr 440				33-	1344
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<212> PRT

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Val Trp Asp Lys Pro Trp Trp Arg Glu Gln Gly Phe Ser Gly Val Leu
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Gln Ser Ser Ser Asp Pro Ile Ser Phe Ala Arg Asp Thr Ser Ile Asp
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Pro Ala Asn Val Leu Glu Ile Glu Trp Ser Lys Gln Gln Tyr Phe Gln
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